

From: gmcshane@servicesteel.org
To: Ken.Scheffler@CH2M.com; [Bottcher, Helen](#); jerry.duppong@ch2m.com
Subject: Re: Review of Field notes at Wyckoff
Date: Tuesday, October 25, 2016 12:33:38 PM

Hi Ken, Helen and Jerry.

I've gone through all of the field notes and offer the following thoughts.

I reviewed the daily logs to see if there was any pattern of difficult driving being recorded, comments of not being able to reach grade, mention of head damage or talk of needing larger hammers. All signs that the piling may not have performed as expected.

I also reviewed hammer blows per minute and rate of installation per ft as well as examine the records for changes in installation rate that indicate an obstruction was encountered followed by an increase in penetration rate as the obstruction was passed or the pile had either de-clutched or was failing by veering off line.

The installation consists of a template that is used to guide the piling. The structure of the template is important especially when you are driving heavy sheet piles with a large inertia as the template is the only resistance to the piles wandering out of plumb or to positional placement accuracy.

I have no doubt that there were template issues throughout the installation caused largely by an inadequate template design. There are many field notes of piles being pulled and re-driven to keep the piles plumb and repairs to the template as it was beefed up to withstand the stress induced by the vibratory hammer. Also comments on the wall wandering and questions being asked in the daily reports if it was correctable. These all point to inadequate template format as well as a less than appropriate design.

There is no description of the template structure so it's not possible to comment specifically on it. However with the Frodingham sheet piles with their tight lock it is imperative that the piles are plumb otherwise they immediately bind in the locks and become un-drivable. Forcing installation with piles out of plumb leads to friction burn on the locks and eventually the locks melting. There is one isolated comment on 'sparks' (P68/202) coming from the lock. There was no apparent lock damage from burning during my site visit.

There are numerous comments on piles being pulled and re-driven due to the piles leaning. Piles do not lean if they are driven within a two framed template with two support points in two planes. Nevertheless there is no comment on driving difficulties encountered with these piles and all appeared to be re-driven to grade.

The early hand written reports contain much more information than the later formatted and typed forms. This is unfortunate as I am sure insights on driving issues have not been noted.

Overall there were no comments on sheet pile head damage which would have been expected to some degree when driving into the till below.

The hardest driving records that I saw show up to 11.8 minutes to drive from 60' to 65'. Most of the hard driving experienced occurred around this depth. Allowing for an impact hammer with approx 60 blows per minute would give 708 blows for 5 ft or 142 blows per ft. This is only 12 blows per inch which is well within normal driving criteria.

The record for 30/202 SP67, 73, 74 mentions the piles being pulled and re-driven and they experienced very hard driving. But no further indication that anything may have happened to the pile.

There are isolated indications of hard driving and then the installation speeding up. Was this a hard layer

broken through? an obstruction broken through or a pile damaged?

Essentially there is nothing in the reports to indicate extremely hard driving was encountered, that there was any pile head damage or that any obstructions prevented the piles getting to grade. That does not mean that there weren't any, just that nothing was reported.

There is also nothing to suggest that one pair of sheet piles had not been connected at all or that a number of piles had partially de-clutched (clearly visible from the front face).

The only feasible way to establish if the sheet piles have fully gone to grade is to use length inductive test equipment (LITE) by GRL. <http://pile.com/pdi/products/lite/>
This involves drilling a small hole using a soil boring rig, and inserting a 2" PVC pipe down to grade. Then a tiny metal detector is dropped to the bottom of the pipe and readings taken as the pipe is raised. Once metal is encountered the beeps tell you where the steel begins. GRL has an office in Seattle if you want to explore this.

Please let me know if you wish to discuss any of this further.

Thanks

Gerry

-----Original Message-----

From: Ken.Scheffler@CH2M.com

Sent: Thursday, October 13, 2016 12:15pm

To: gmcshane@servicesteel.org

Cc: Bottcher.Helen@epa.gov, Jerry.Duppong@CH2M.com

Subject: Re: May found the Sheet Pile field notes (UNCLASSIFIED)

Yes thanks no hurries

Sent from my iPhone

> On Oct 13, 2016, at 9:11 AM, Gerry McShane <gmcshane@servicesteel.org> wrote:

>

> Ken

> The K&S for forwarding. I'm currently in NYC at the DFI conference until Sat. I'll review these next week.

>

> Gerry

>

> Sent from my iPhone

>

>> On Oct 13, 2016, at 11:10 AM, <Ken.Scheffler@CH2M.com> <Ken.Scheffler@CH2M.com> wrote:

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>> I took a quick glance at these field notes there are some blow counts but does not appear to be complete for all piles. Looks like they had problems with alignment and the whalers. It has vibratory and impact hammer information but it is not clear to me what piles received impact hammer. Helen there is also a lot of discussion about how they determine if they are into the aquitard and how deep they should

drive the piles.

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>> Gerry go to page 40/202 and the next 30 pages there are time intervals for driving pile for 5 foot increments. The numbering system is confusing but I think the first number is the turn point and the second number is the pile in that sequence. Therefore 9-140 is 140 pile after turn point 9. I have attached the site plan and sections again. The two piles that are disconnected on the east side are 9-140 and 9-153. I did not see a log for those specific piles. But look at page 54/202 for pile 9-67 which is getting close to the disconnected piles they were hammering for 5 to 7 minutes to drive 5 feet.

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>> Also look at page 148/202 for 10-3 there are blow counts for deeper section. 10-3 is about 20 piles to the south of one of the separated joints. They recorded 50 to 180 blows per foot for that pile.

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>> I need to spend some more time with these field notes but thought I would forward.

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>> -----Original Message-----

>> From: Brown, Ellen K NWS [mailto:Ellen.K.Brown@usace.army.mil]

>> Sent: Wednesday, October 12, 2016 3:28 PM

>> To: Bottcher, Helen <Bottcher.Helen@epa.gov>; Scheffler, Ken/SEA <Ken.Scheffler@CH2M.com>

>> Cc: Carrell, May G NWS <May.G.Carrell@usace.army.mil>; Laubach, Marlowe D NWS

>> <Marlowe.D.Laubach@usace.army.mil>; Shaw, Travis C NWS <Travis.C.Shaw@usace.army.mil>

>> Subject: May found the Sheet Pile field notes (UNCLASSIFIED) [EXTERNAL]

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>> CLASSIFICATION: UNCLASSIFIED

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>> Thank you, May!

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>> Ellen K. Brown, P.E.

>> Program/Project Manager

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>> CLASSIFICATION: UNCLASSIFIED

>> <Field note compilation.pdf>

>> <Sheet Pile Wall plan.pdf>

>> <SP wall pile numbering profile 1.pdf>

>> <SP wall pile numbering profile 2.pdf>

>> <SP wall pile numbering profile 3.pdf>

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